REMARKS

By this amendment, Applicants have amended claim 5 to recite that the resin substrate is flat resin substrate or that the resin film on the substrate is a flat resin film on the substrate. See, e.g., Figures 1a, 4a, 7a, 9a, 11a, 13a and 19a. Applicants have also added claim 26 to recite that the concave or convex portions of the concave-convex pattern have a width or diameter of 300 nm or less. See, e.g., page 7, lines 1-2; page 9, lines 2-3; page 14, lines 5-7; and page 17, lines 27-28 of applicants' specification. Applicants have corrected the dependency of claim 25.

In view of the amendment to 25 correcting its dependency, reconsideration and withdrawal of the rejection of claim 25 under 35 U.S.C. §112, second paragraph, are requested.

Claims 3-5, 7-10 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0009673 A1 to Sreenivasan et al. in view of U.S. Patent No. 2,201,302 to Rowe. Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to a nanoprint mold for deforming a flat resin substrate or a flat resin film on a substrate to form a fine structure on a substrate with use of a press machine. See, e.g., Figures 9a-9c of the subject application. According to the present invention and as shown by way of example only in Figures 8-10, the mold includes a laminated structure including a base member having a curved surface and a pattern member having a concave-convex pattern. The mold is provided with a curved surface on the side thereof on which the concave-convex pattern is formed. The mold is also provided with a deep groove (deeper than the concave portions of the concave-

convex pattern) at a center portion of the mold between extending to an open to the periphery portions. By virtue of the curved surface and the deep groove, the mold is easily released from the flat resin substrate or flat resin film after forming the fine structure. With the use of the deep groove, air is introduced to the deep groove at a center of the substrate to provide a release-start point resulting in the ease of releasing the substrate from the mold after transfer printing.

The Sreenivasan et al. publication teaches methods and systems for micro- and nano-imprint lithography processes. On the other hand, Rowe teaches a mechanism for printing or etching insignia on glass lamp bulb, but fails to teach the nano-imprint technology. The Rowe techniques are not at all similar to those of Sreenivasan et al.

Firstly, the printing mechanism of Rowe is much different from the nano-imprint lithography of Sreenivasan et al. in size of pattern. The size of pattern on the stamp of Rowe is at least more than 1 cm, as can be seen from Fig. 3 of Rowe, since the insignia is formed on glass lamp bulb. On the other hand, the size of pattern of nano-imprint technology is much smaller than that of Rowe et al. "Imprint lithography processes have demonstrated the ability to replicate high-solution (sub-50 nm) images on substrates using templates that contain images as topography on their surfaces." See paragraph 0054 of Sreenivasan et al. Accordingly, one of ordinary skill in the nanoprint art would not recognize the Rowe techniques as applicable to the completely dissimilar Sreenivasan et al. method.

Secondly, the nano-imprint technology of Sreenivasan et al., as well as that of the present invention, is much different from the printing mechanism of Rowe in the problem of damage to the mold upon release. In nano-imprint technology, a mold

having a concave-convex pattern is stamped on a resin substrate, or a resist film layer formed on the substrate, thereby transferring the pattern on the mold onto the resin substrate or resin film. When the mold is pressed on the resin film or the resin substrate, resin is forced into the concave portions of the pattern. Accordingly, it is difficult to release a mold from the substrate, once the mold has been pressed thereon, with high accuracy and without deforming the fine concave-convex pattern formed on the substrate. The Rowe techniques have no such problem of release, since the glass of the lamp bulb is never forced into the concave patterns of the stamp.

Rowe fails to teach a nanoprint mold for deforming a resin substrate or a resin film on a substrate to form a fine structure. Rowe's mechanism for printing or etching insignia on glass lamp bulb does not address the problem of improving the release of a nanoprint mold from the substrate, with high accuracy and without deforming the fine concave-convex pattern formed on the substrate.

According to the present invention, to improve the release of a nanoprint mold from the substrate, the mold of the present invention is provided with a curved surface on the side thereof on which the concave-convex pattern is formed. Rowe fails to teach the mold being provided with a curved surface on the side thereof on which the concave-convex pattern is formed, in order to facilitate the release of a nanoprint mold from the substrate.

Thirdly, in Rowe, the object to be printed, which is glass lamp bulb, has a spherical convex surface and is not made of deformable material such as resin film or resin substrate. On the other hand, according to the present invention, the object to be printed is a flat resin substrate or a flat resin film on a substrate, as recited in amended claim 5.

As shown in Fig. 3 of Rowe, the rubber stamp 11 has a printing surface 12, a thicker central body 13, a resilient pad 24, and a backing element 19. The stamp holder 15 has a body 16 and a threaded extension 17 carrying a nut 18. The outer surface of the backing member 19 is shown as spherically convex, because it is particularly adapted for use with a holder 15 for printing on spherically concave surfaces. The spherical convex surface of backing member 19 of Rowe is for printing on spherically concave surface of glass lamp bulb, but is not for facilitating the release of a rubber stamp from the glass bulb.

For the foregoing reasons, one of ordinary skill in the art would not have recognized the Rowe techniques as applicable to the Sreenivasan et al. method, since Rowe is not similar to the Sreenivasan et al. method.

For the foregoing reasons, the presently claimed invention is patentable over the proposed combination of Sreenivasan et al. and Rowe.

Claims 6 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sreenivasan et al. and Rowe and further in view of U.S. Patent Application Publication No. 2002/0132482 A1 to Chou. Applicants traverse this rejection and request reconsideration thereof.

The Examiner has cited the Chou publication as allegedly teaching several means to soften or cure a film such as UV and heating. However, clearly nothing in Chou remedies any of the basic deficiencies noted above with respect to Sreenivasan et al. and Rowe. Accordingly, claims 6 and 11 are patentable at least for the reasons noted above.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

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paper, including excess claim fees, to Deposit Account No. 01-2135 (1021.43672X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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